

**establishing a connection between
IASOA
and
the TROPOS cloud group**

-

**possible analysis
for INP number concentrations
based on filter samples
taken in the Arctic**

Heike Wex

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- homogeneous freezing of water at $T < -38^\circ\text{C}$

-> warm clouds ($T > 0^\circ\text{C}$)

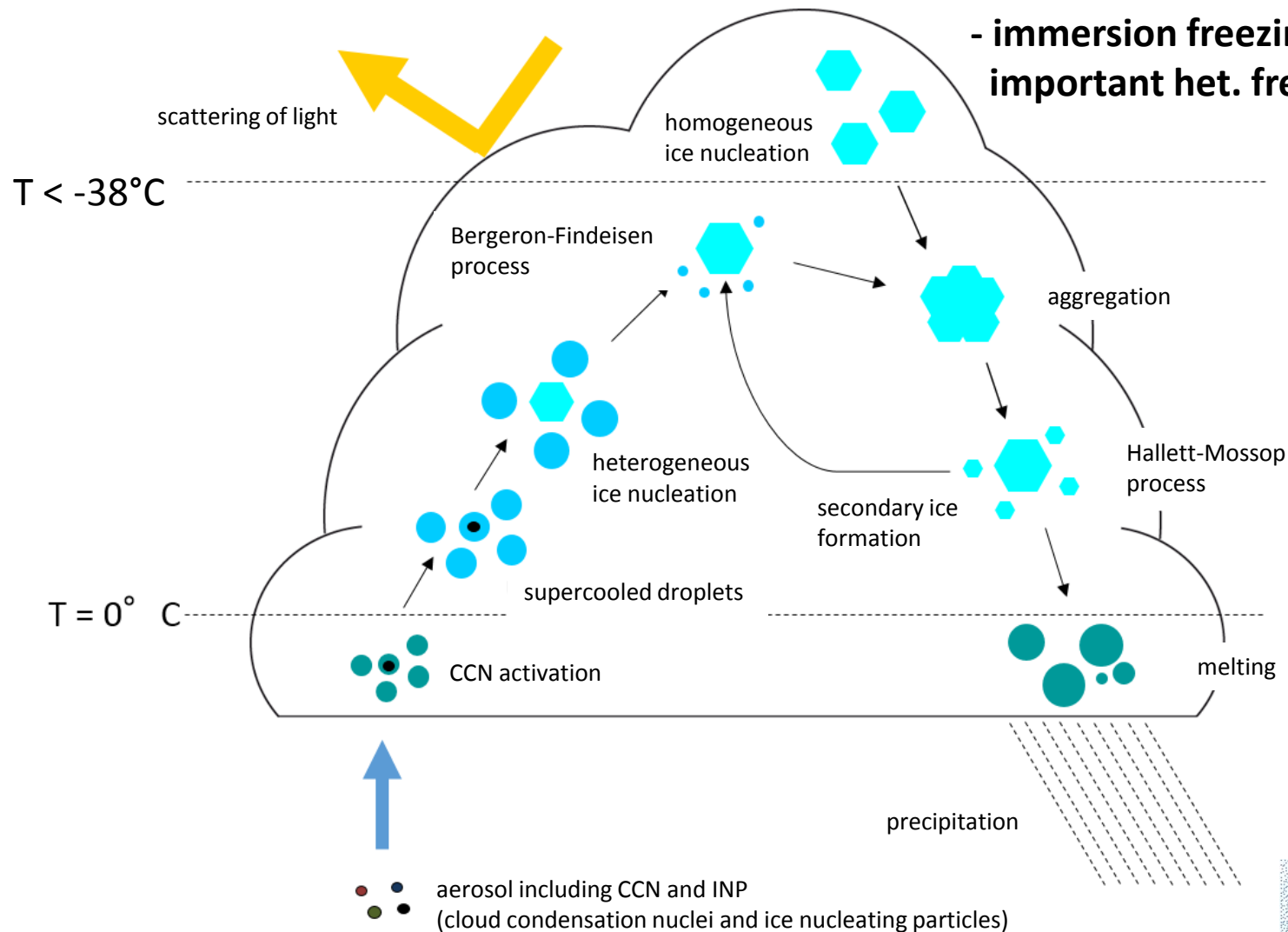
-> ice clouds ($T < -38^\circ\text{C}$)

-> mixed phase clouds ($-38^\circ\text{C} < T < 0^\circ\text{C}$):

- precipitation formation

- radiative effects

- immersion freezing most important het. freez. process



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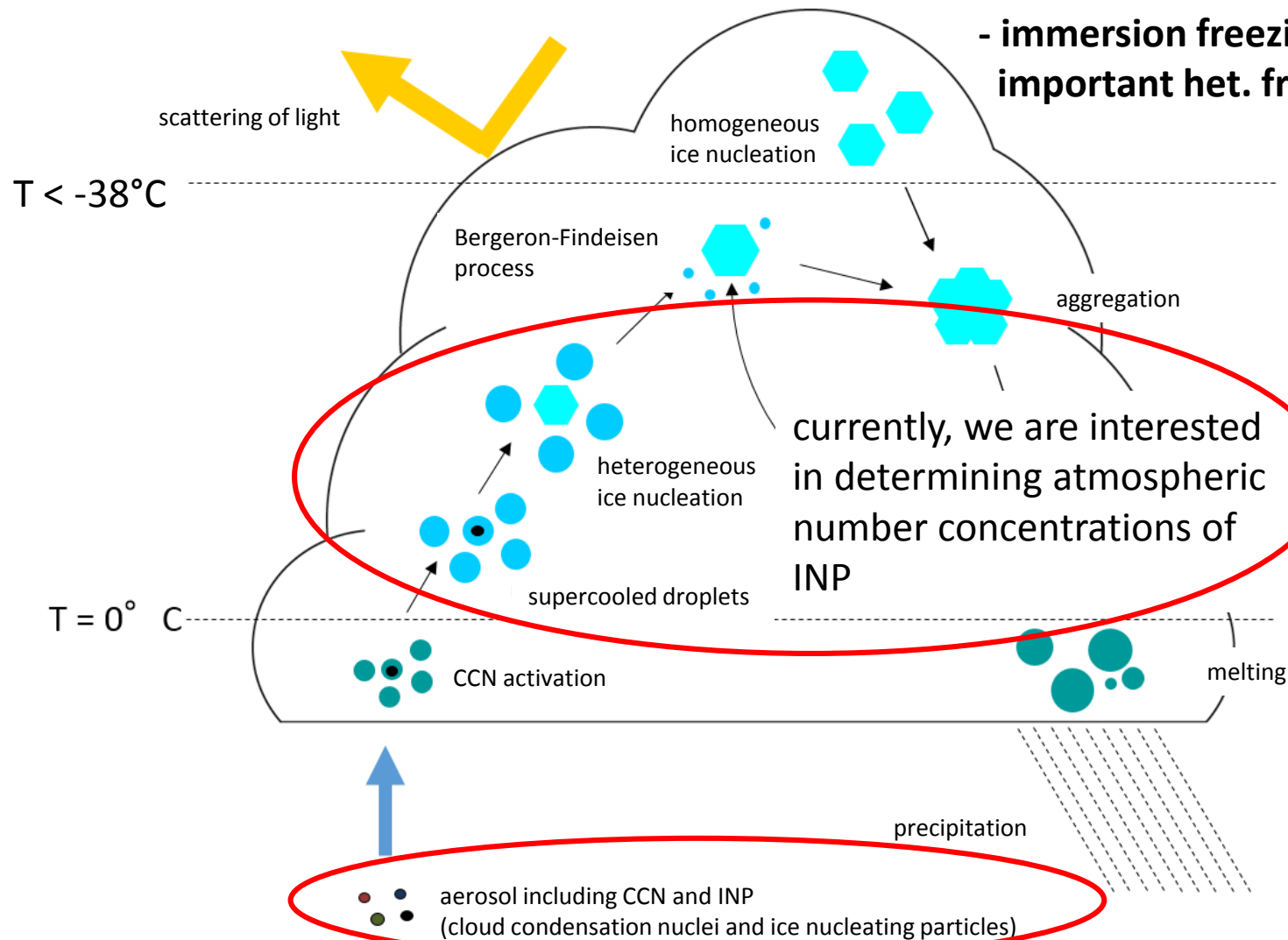
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filter samples for off-line analysis of Ice Nucleating Particles (INP) number concentrations (N_{INP})

high volume
Digitel sampler

-> typically
sampled onto
quartz fiber filters

exists at Station
Villum – also at
other Arctic
stations?



low volume
Digitel sampler

-> using
polycarbonate
filters

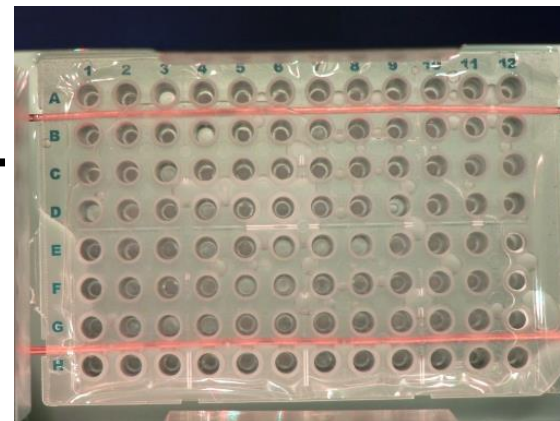
determining N_{INP} from filter samples („INDA“)

(based on high volume filter samples, offline analysis at TROPOS)



each filter stance
in 50 μ l water

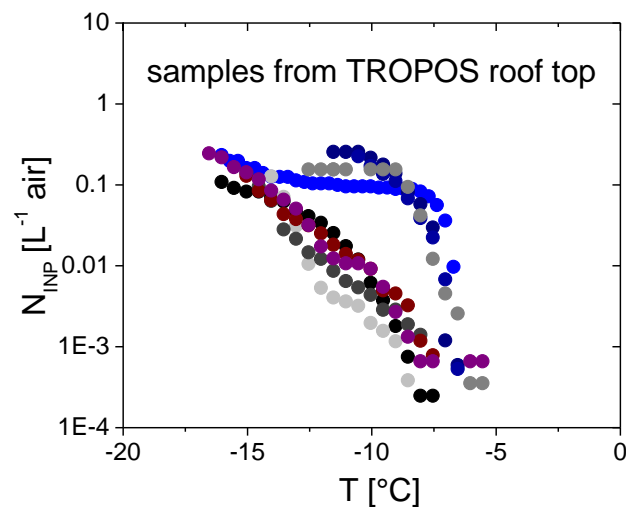
tubes in a
thermostat



detect ice
nucleation
during
cooling

dark grey spot
-> frozen tube

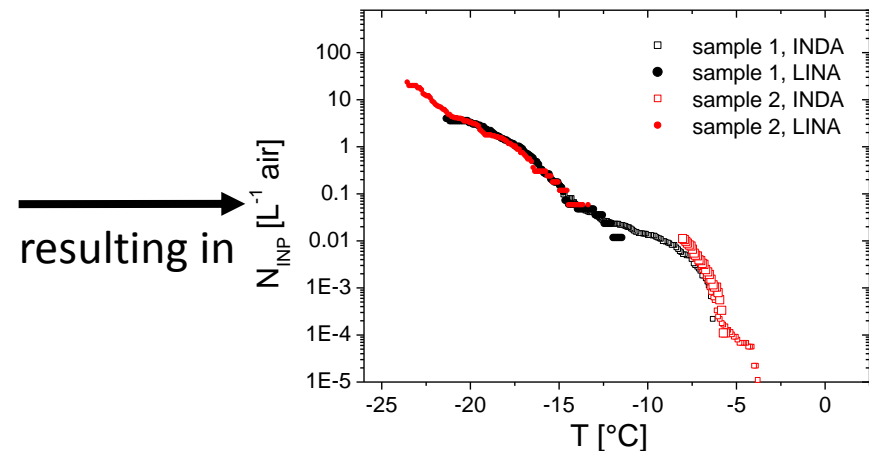
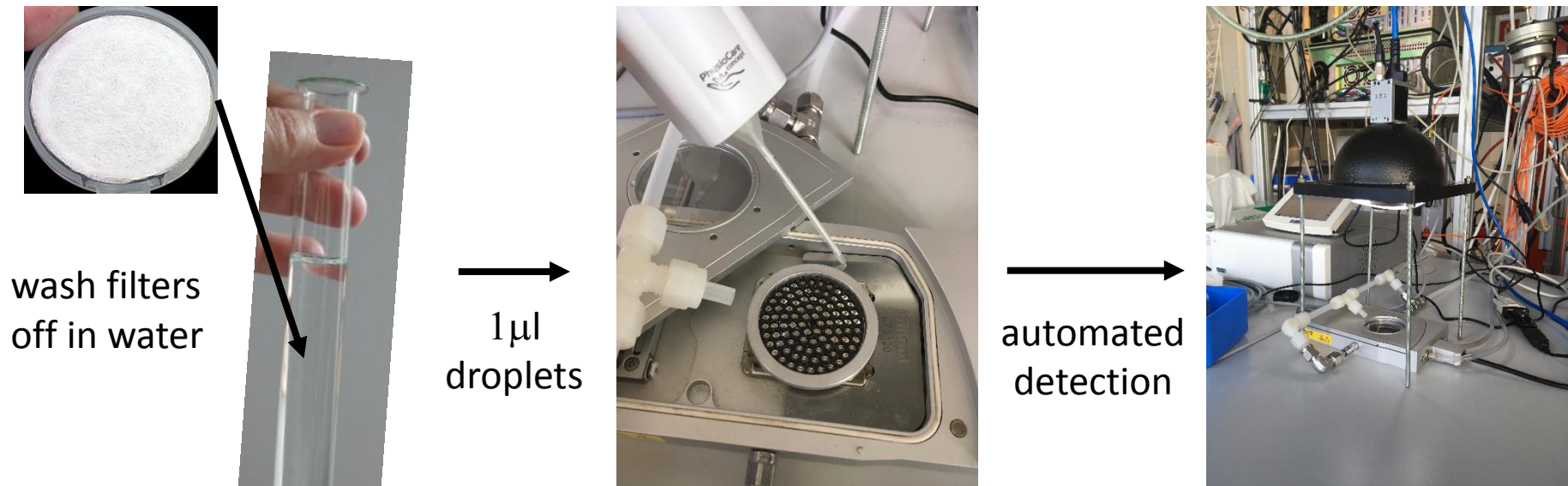
resulting in



method first suggested in Conen et al. (2012)

determining N_{INP} from filter samples („LINA“)

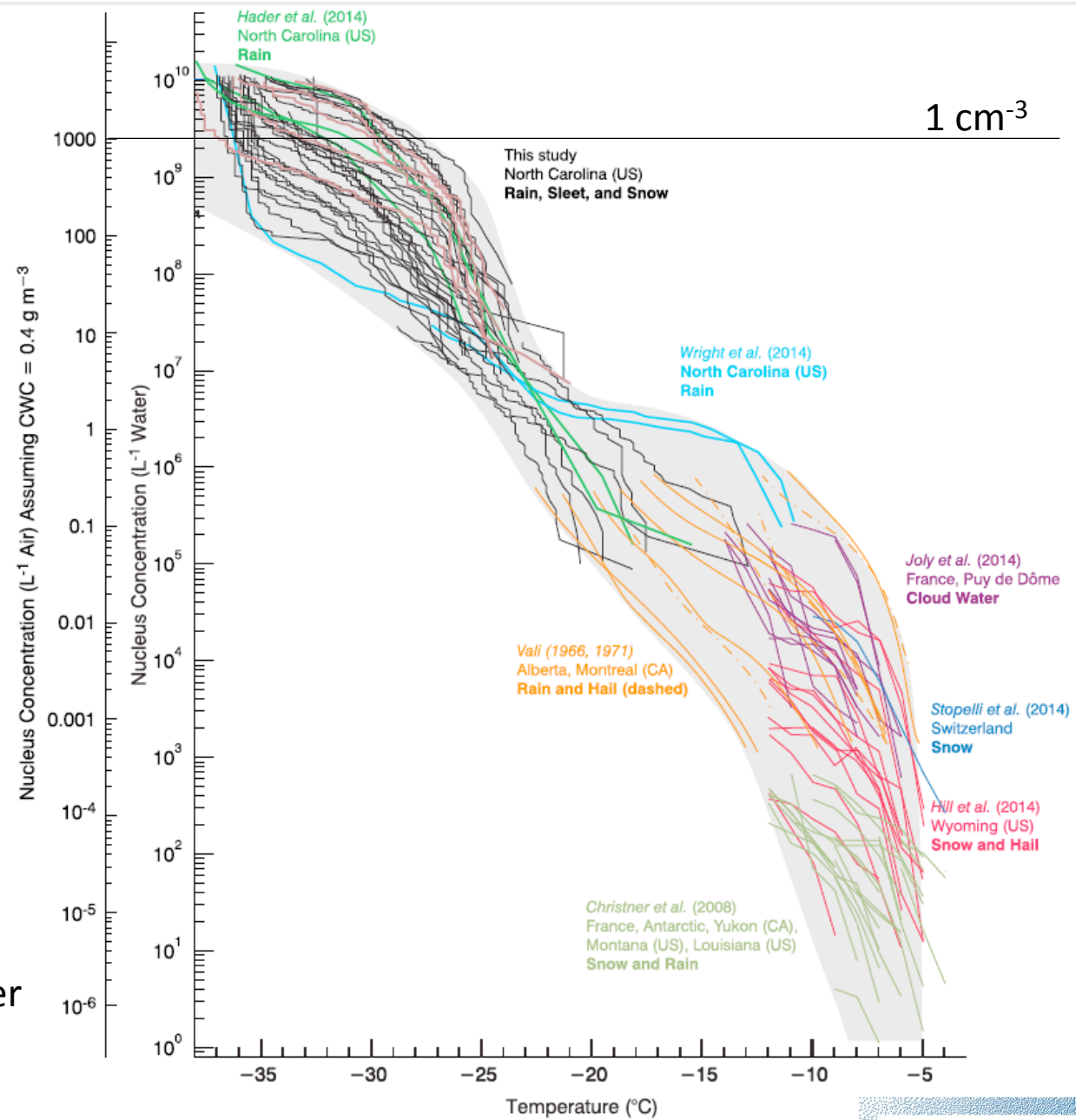
(based on low volume filter samples, offline analysis at TROPOS)



Revisiting ice nucleation from precipitation samples

M. D. Petters¹ and T. P. Wright¹
Geophysical Research Letters

- $\sim N_{\text{INP}}$ one order of magnitude less per 5K T-increase
- at $T < -20^{\circ}\text{C}$: INP are minerals
- at $T > -20^{\circ}\text{C}$: biological INP
- biological INP can be:
 - bacteria
 - pollen
 - fungal spores
 - algae
 - lichen
 - ...
- also observed in lakes, rivers and the ocean (more the colder the environment)



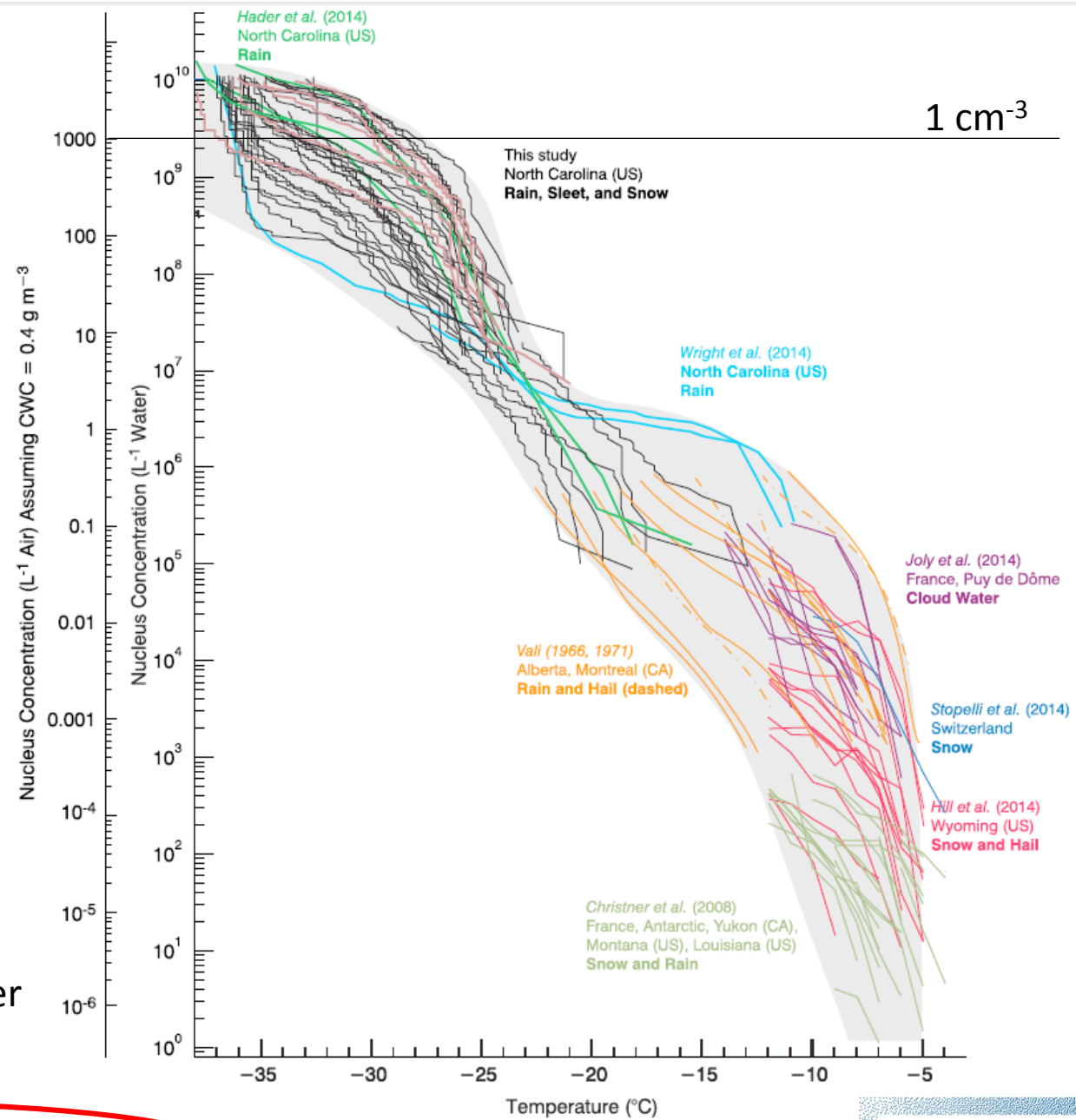
INP in surface micro layer: Wilson et al., 2015



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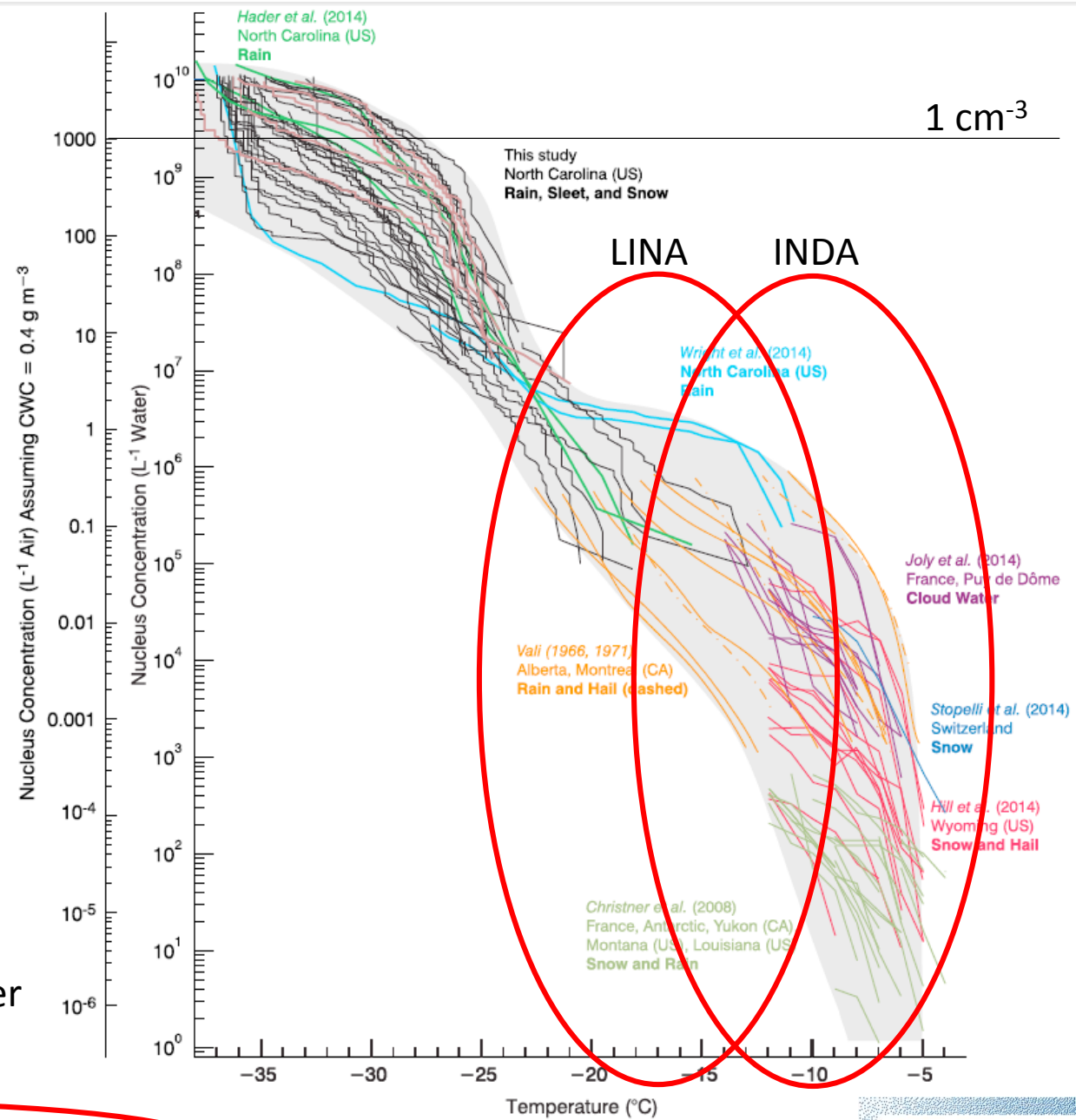


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my question / request

- At which of the Arctic stations were filter samples taken (ever, or even regularly, and with which sampling time and time resolution)?
- For existing filter samples, would you be willing to give me a punch (per filter, one of these punches with 2 cm diameter would be sufficient, or a 1.5cm x 1.5 cm piece)?
- Ideally, I would be interested in having samples from one or two different years covering different times / conditions during these years for as much of the Arctic region as possible!
- For those of you who say „yes“ to the two questions above:

Please tell me and then I'll discuss with you which samples and how to transport them!

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